

set with fine pale pubescence, on either side of which are black setæ.

This is nearer than any other of the Japanese species to our European *M. splendidus*, but is not very close to it.

Yokohama, Kiga, Miyanoshita.

Mycetoporus duplicatus, n. sp.

Rufo-testaceus; clytris nigricantibus, basi late rufo-testaceo, serie suturali multipunctato, seric dorsali duplicato.

Long. 5 millim.

Antennæ moderately long, penultimate joints scarcely so long as broad. Head yellow, slightly infuscate. Thorax clear yellow, broader than long. Elytra rather elongate, more than half of their surface black, the base being clear yellow; the punctures of the sutural series are numerous and distinct, about fifteen in number; the dorsal series is duplicate. The hind body is clear pale red, rather closely punctate. The legs are yellow.

Chiuzenji, 21st August, 1881; two examples.

Mycetoporus Lewisius.

Bryoporus Lewisius, Sharp, Trans. Ent. Soc. Lond. 1874, p. 19.

Mr. Lewis has now obtained other specimens of this insect, and it is clear from the structure of the palpi that the species would be better placed in the subgenus *Ischnosoma* of *Mycetoporus* than in *Bryoporus*. This species and *M. duplicatus* connect, however, *Mycetoporus* rather closely with *Bryoporus*.

Nagasaki in April; four examples.

[To be continued.]

LXI.—*Notes from the St. Andrews Marine Laboratory (under the Fishery Board for Scotland)*.—No. IX. By Prof. M'INTOSH, M.D., LL.D., F.R.S., &c.

1. On *Lesueuria*, a Ctenophore new to Britain.
2. On the Development of Mussels (*Mytilus edulis*).
3. On a Post-larval Pleuronectid (Turbot?).
4. On a Post-larval *Cottus* contrasted with the Gadoids.
5. On the appearance and disappearance of *Lucernaria* and other Forms.

1. On *Lesueuria vitrea*, *M.-Edwards*.

Comparatively little attention has been given by British

naturalists to the Ctenophores, though at least two species have long been known as inhabitants of our seas, viz. *Pleurobrachia* and the ordinary *Beroë* (termed *Idyia cucumis* by Dr. Merle Norman). The former is perhaps the most abundant and ubiquitous Cœlenterate in inshore waters in all stages of growth and at all seasons of the year, from January to December—not, as formerly pointed out, always near the surface, but often for long periods in our changeable climate towards the lower regions of the water. The latter again is more characteristic of the warmer months of the year, from July till September, and the adults are often in vast masses at the surface, especially in such regions as the voes of Shetland and the Frith of Forth, though it is of course met with almost everywhere round our coasts.

In using the large mid-water net in St. Andrews Bay at a depth of 3 fathoms on the 19th May this year considerable numbers of a form agreeing with *Lesueuria vitrea*, M.-Edwards, were found amongst hosts of *Pleurobrachia* and Hydromedusæ. They were recognized by their great translucency, powerful locomotive flappers, and characteristic shape; moreover, on further examination their extreme delicacy was conspicuous; indeed, they are the most fragile of a fragile group, and yet at this time the specimens were not large—only from $\frac{3}{4}$ to $1\frac{1}{2}$ in. in long diameter. From this period onward to September they presented themselves almost daily in great abundance in the mid-water net, and throughout the bay generally, so that it was as common to meet with them as with *Pleurobrachia*. In respect to novelty they took the place of *Clione* of the previous year.

They varied in size from the period just mentioned onwards, that is, both large and small forms were present throughout, the maximum of $3\frac{1}{2}$ in. or rather more being reached, however, on August 4th. The reproductive organs appeared to attain maturity towards the end of June and in July. The capsule of the ovum measured $\cdot 016$ in. and the ovum proper $\cdot 0083$ in. in a specimen procured in the first week of July.

The genus *Lesueuria* was established in 1841 by Milne-Edwards in his description of the structure and functions of certain zoophytes &c. from the shores of France, the name being given in honour of the able fellow-worker of Péron in the description of the forms procured during the well-known voyage to the Australian seas. He had found this new Ctenophore (2 centimetres long) in great abundance in the Bay of Nice. The account* of *Lesueuria*, as given by the distinguished French zoologist, corresponds generally with

* Ann. des Sc. nat. 2^e sér. tome xvi. p. 199, pls. ii., iii., and iv.

the specimens found at St. Andrews, so that it is unnecessary to repeat it. The contractile filaments, however, in connexion with the principal lobes are much more distinct than he figures them, and the concretions in the ctenocyst are minutely botryoidal or form a crystalline coarsely granular mass (see woodcut), and are perfectly colourless, instead of being reddish, as in the Mediterranean form. There are tinted granules (pinkish), however, at the bases of the water-vessels. It is also worthy of note that in July and August certain examples showed a much larger development of the principal lobes at the sides of the mouth than had been observed earlier in the season. They projected like two large flaps at the sides of the aperture, approaching in this respect the *Euramphæa* of Gegenbaur (*Mnemia* of M. Sars *). The species has since been found at Nice by Verany and at Naples by Sars and Spagnolini †.



Concretion in
ctenocyst.

On the shores of North America (Massachusetts Bay and Newport, R. I.), again, Alex. Agassiz procured a species of the same genus, and described it in 1865 along with other Cœlenterates. This species grows to a large size, viz. 4 inches in polar diameter, and "is as transparent as *Bolina* and even more sluggish. It is exceedingly abundant during September, large numbers being visible during any clear hot day. Its phosphorescence is a very peculiar bluish light, of an exceedingly pale steel-colour, but very intense" ‡.

The examples at St. Andrews swam steadily in the water, and more actively than *Beroë*, as might be expected from their very powerful locomotive flappers. The mouth was generally uppermost. Nothing of moment was observed in the gastric chamber, and hence they formed a striking contrast with *Pleurobrachia*, which is so greedy that it engulfs post-larval fishes, and thus it is necessary to remove the latter from contact with the *Cydippes* the moment the net is brought on board. Like the American species, that at St. Andrews was beautifully phosphorescent, the light being intense and almost white. It is readily emitted by merely blowing on the water, and glances brightly along the ctenophores or locomotive flappers. Messrs. Pentland Smith and J. Walker, who examined the light with me in May, thought it faintly greenish; but though not pure white, the tinge of greenish or bluish was hardly distinguishable.

* 'Beskrivelser og Jagttagelser &c.,' p. 32, pl. vii. fig. 16.

† *Fide* 'Prodromus Faunæ Mediterranæ,' i. p. 55.

‡ 'North-American Acalephæ,' p. 24.

2. *On the Development of Mytilus edulis.*

In the 'Annals' for February 1885 a few remarks on the reproduction of the common mussel were noted. Amongst other things it was shown that the development of the reproductive elements of well-grown mussels from the Eden had made considerable progress in January and February, so that ripe sperms and well-developed ova were present. In full maturity, as in April, the orange mantle further was richly arborescent from the racemose sperm-sacs and ducts, but less distinctly so in the female. The sexual elements diminished in May, June, and July, the general stroma of the mantle being vesicular and granular, so that the characters of the sexes were absent. It was thus apparent that there was a period of resolution and rest as well as a period of functional activity in the reproductive organs. The ova again appear in the larger forms in September.

Since that period the development of the mussel has been the subject of a special research by Mr. John Wilson, B.Sc., who has published several papers—the last illustrated by three plates (4to) *. He found artificial impregnation of the ova—by tearing the mantle carefully to pieces—the best mode of procedure, and he was thus enabled to follow the early stages, that are not so readily procured in the sea as the later, in which the shell has attained considerable dimensions. As had formerly been pointed out †, he also found that comparatively small specimens were mature, and that many of those amongst the tidal rocks and elsewhere carried such reproductive elements till August; indeed, he partially succeeded in fertilizing ova on the first of the latter month.

The main point of the present note, however, is the fact that the older mussels in one part of the estuary of the Eden are covered with dense feathery masses of *Gonothyræa*, upon which the young mussels settle as soon as they quit pelagic life, and thus an interesting phase in their history is determined. For many years it had been one of the ordinary features of the district to find very young mussels on zoophytes and seaweeds, especially on *Obelia* and *Gonothyræa*. By watching the latter in the bed of the Eden and in the line of the pelagic young it was observed that the mollusks first settled on the zoophytes in July, the twigs being densely covered with young mussels varying from $\frac{1}{7}$ to $\frac{1}{2}$ of an inch, some showing three gill-papillæ, others thirteen, the larger,

* Fifth Ann. Report, Fishery Board for Scotland. This important paper has been overlooked by some recent writers on the subject.

† Ann. & Mag. Nat. Hist., Feb. 1885.

moreover, having the bluish tinge of the shell, which is also somewhat elongate. An almost inexhaustible stock of young mussels could thus be obtained at an early stage for transporting to any fresh site. Their attachment, moreover, is readily loosened (as in the older stages), for if the water in the vessel be impure, they leave the zoophytes and congregate at the margin of the water inside the vessel.

Before they are found in these dense masses on the zoophytes they often occur amongst the sandy débris around the older mussels, and of course are very abundant in the bay generally, as formerly mentioned *, indeed they constitute one of the most striking features of collections of pelagic organisms. While in May and June they are comparatively few, they increase vastly in number in July and August, both at the surface and towards the bottom. Moreover their size somewhat increases as the season progresses, especially towards the bottom of the water, those in the upper parts preserving perhaps greater uniformity in size throughout the season.

The duration of the existence of these young mussels on *Gonothyraea* and similar zoophytes is limited, for towards the end of September only the stumps of the former are found on the adult mussels, the rest having been swept away to other sites. Numerous young mussels, however, still cling to the stumps and to the rough surface of the adult shells. They have now grown considerably—varying as a rule from $\frac{1}{25}$ to $\frac{1}{10}$ of an inch. Successive crops of *Gonothyraea* thus serve as a nidus for the attachment of the young mussels, which thereafter seek new ground for further growth.

It is many years since I pointed out the peculiar sites sometimes chosen by the young mussels on quitting their pelagic existence. Thus, previous to 1860 † it was often observed that they attached themselves to the sockets of the eyes of *Carcinus menas*, and during growth caused evulsion of the ocular peduncles and injury to sight, and so with the antennules, while others fixed the abdomen of the crab to the cephalothorax by their byssi, so as to interfere with reproduction. Some time ago mussels of considerable size were found in more than one instance in perfect health on the gills of the haddock ‡, their growth causing the operculum to bulge outward and greatly to impede the functions of the parts. It has often been shown that the Gadoids in their young condition are very fond of feeding on the

* 'Report of H.M. Trawling Commissioners,' &c.

† Thesis Univ. Edinb. pp. 18 and 19.

‡ These specimens were lately in the Glasgow Exhibition, and are now in the University Museum, St. Andrews.

young mussels when they are settling in autumn on the blades of the seaweeds or on the rocks fringing St. Andrews Bay; and it is possible the minute young mollusks then attach themselves to the gills and grow apace with the young fish, the relative sizes of the two species being a feature of considerable interest. In these and other instances which need not at present be multiplied the young mussels fix themselves on sites well adapted for both aeration and food.

It is, again, an erroneous view (not altogether confined to the unscientific observer) to suppose that because mussels of considerable size are found on a particular site, *e. g.* a ship's bottom, this indicates that since last "cleaning" they have grown from their pelagic stage to the, it may be, very considerable size in question. As Mr. Wilson has shown, it is a well-known fact that mussels can leave their sites and fix themselves to new ones by a fresh secretion of the byssus. Indeed, in France they are often artificially torn off and placed in slender netted bags for attachment to poles or wattles. Before the meshes of the net give way they are again firmly fixed. All that is required therefore in the case mentioned is that the ship settle down on the mussels in the harbour, detach some, and for these again to fix themselves afresh to the ship's planks. If in addition to these the timbers are already coated with a series of small forms whose fixation dates from the pelagic period, a somewhat complex condition is presented.

3. *On a Post-larval Pleuronectid (Turbot?).*

In the large mid-water net at $3\frac{1}{2}$ fathoms over sandy ground off the estuary of the Eden, on the 22nd August, a post-larval Pleuronectid measuring 5 millim. was obtained. Its coloration was so striking that at first sight it seemed to be provided with a series of dorsal papillæ or processes, the first of which projected from the occiput. This appearance, however, was only due to the boldness of the pigment and the extreme translucency of the marginal fin. The latter stretched from the tip of the snout to the tail, which was somewhat oblique from the dorsal bend of the notochord, and again along the ventral line forward to the abdominal projection.

The fish had reached the stage at which the Pleuronectid character was evidenced by the great ventral increase of the abdominal region and by the depth of the body generally, while the upward bend of the notochord and the slight development of the hypural elements were also noteworthy. The

most conspicuous feature, however, was the presence of the deep ochre-pigment in the dorsal marginal fin. The first spot occurred at the occiput, and at first sight simulated the long process seen in the larval *Arnoglossus* *. The marginal fin was continuous and uniform. Behind were other five, very boldly marked, ramose pigment-areas, somewhat conical in shape, the base being at the margin of the muscle-plates of the body. Two less distinctly marked spots existed in the ventral marginal fin, each being somewhat behind the corresponding dorsal areas (last two). A series of small stellate chromatophores ran along the margin of the body dorsally and ventrally, commencing behind the occipital pigment-patch dorsally, and numbering about fifteen in that region, while ventrally about fourteen existed between the posterior border of the abdomen and the tip of the tail. Various chromatophores of the same hue extended over the abdominal surface and the head and cheeks, and many minute dark specks occurred on the same regions as well as on the sides of the body. Along the margin of the body, between the large and small chromatophores, similar pigment caused a series of serrations by transmitted light. The eyes are relatively small and of a bluish silvery aspect.

After immersion in spirit the body was marked all over with blackish pigment, indicating that perhaps the latter had formerly been obscured by the chrome.

So far as appearances and general structure go this little post-larval fish closely approaches the condition to be expected in the turbot, ripe ova of which were first procured in the trawling expeditions in July 1884.

4. *On a Post-larval Cottus contrasted with the Gadoids.*

In the mid-water net on the 28th May a post-larval *Cottus* 9 millim. in length occurred. It is easily distinguished from the young Gadoids of the same size, so plentiful at this period, by its shorter snout, smaller mouth, and smaller eye, as well as by the deeper greenish pigment, with a trace of yellow on the head and abdomen. Moreover, the latter is much more densely and somewhat regularly spotted with blackish pigment, the whole having a tessellated aspect. Further, from the greater tenacity of life in this species the body does not so soon assume the whitish opacity so characteristic of the Gadoids; indeed, though the specimen was perfectly motionless, the heart was still pulsating. The blackish pig-

* *Vide e. g.* Dr. F. Raffaele's figs. 12 and 18, pl. iii., 'Mittheilung a. d. Zool. Stat. zu Neapel, 8, Bd. i. Heft, 1888.

ment again is confined to the ventral edge instead of passing along both dorsal and ventral edges as well as some distance up the sides, as in the Gadoids.

Except in the tail the young Gadoid of the same size has only embryonic rays in the continuous marginal fin, while in *Cottus* a considerable number of rudimentary true rays occur both dorsally and ventrally (10 or 11 dorsally and 6 ventrally). In the ventral the true rays commence behind the anus. Those in the dorsal begin just above the latter, that is in the posterior division of the body. No permanent rays appear in the dorsal and ventral marginal fin, even though the example exceeds the Cottoid of this stage in length.

A very evident difference occurs in regard to the tail in those of equal length. Thus, the hypural and epidual elements are more or less equally developed dorsally and ventrally in the Gadoids, the ventral series, however, terminating in one or two larger cartilages. The tapering notochord is straight and extends considerably beyond both series. True caudal fin-rays, moreover, are developing both dorsally and ventrally—giving the tail a peculiarly symmetrical or "feathered" appearance.

On the other hand, the notochord in *Cottus* is somewhat less finely tapered, it has a thicker sheath, and the hypural elements alone are conspicuous in the form of a large inferior and two upper cartilages. The permanent caudal rays are developed only inferiorly, while the whole dorsal half and the region extending to the last ray of the dorsal fin have embryonic rays.

5. *On the Appearance and Disappearance of Lucernaria and other Forms.*

About thirty years ago shannies were extremely common in the rock-pools at St. Andrews and under moist seaweeds on ledges and elsewhere amongst the rocks. Now it is difficult to secure a few adults over a wide area of the same region. One of the most abundant Crustaceans on the beach at all seasons of the same period was the little *Portumnus variegatus*, dried specimens occurring here and there daily on the sands. This species is now one of the rarest of the group, no specimen having been procured for a long time. On the other hand, *Portunus holsatus* has apparently increased in numbers. Small examples of *Lucernaria* formerly occurred on seaweeds, especially *Fucus serratus*, both at the rocks near the mouth of the harbour (where they were first found by Miss Otté and Prof. G. E. Day) and in the extensive

shallow pools about half tide-mark at the East Rocks. These, with others of the same size from various parts of the British shores, were considered fine specimens by Prof. Häckel*. For several years they have been extremely rare, only one or two having been secured after diligent search. A series of large and beautiful examples, however, somewhat suddenly made their appearance this autumn on the seaweeds on the rocks near the mouth of the harbour; indeed, they occurred in considerable abundance and all were several times as large as formerly. They were first noticed by my excellent assistant Mr. Pentland Smith; but a more detailed study of them has been undertaken by Mr. W. L. Calderwood, who will probably investigate the life-history as well as the structure of the species.

LXII.—*Contributions to our Knowledge of the Myriopoda of Dominica.* By R. I. POCOCK, of the British Museum (Natural History).

[Plate XVI.]

MOST of the specimens which form the subject-matter of the present paper were collected by Mr. G. A. Ramage under the superintendence of the West-Indies Exploration Committee. Those specimens, however, of which the names are marked with an asterisk were taken in 1883 by Mr. G. F. Angas.

I. CHILOPODA.

Fam. Scolopendridæ.

Scolopendra alternans (Leach).

Scolopendra alternans, Leach, Trans. Linn. Soc. xi. p. 383, et auctt.

Four specimens.

This species appears to be generally distributed throughout the West Indies; it occurs also in South America. The British Museum possesses specimens from St. Kitts, Antigua, Haiti, Colombia, and one from South Africa.

For additional localities and a list of synonyms for this species see Meinert, Proc. Amer. Phil. Soc. xxiii. p. 193.

* Vide 'Syst. d. Medusen, Vorwört,' p. xviii.